

CLAIMS

What is claimed is:

1. In a data processing system executing tasks in different time partitions, a method of scheduling tasks comprising:
determining available slack; and
allocating slack to tasks in different time partitions.
2. The method of claim 1 wherein the tasks that are allocated slack are aperiodic, non-essential tasks.
3. The method of claim 2 wherein the tasks comprise essential and non-essential tasks, and wherein the tasks that are allocated slack are from the group consisting of new non-essential tasks and enhancements to essential tasks.
4. The method of claim 1 wherein in determining, both timeline slack and reclaimed slack are determined.
5. A machine-readable medium having instructions stored thereon capable of causing a processor to carry out a method, the method comprising:
scheduling tasks to execute in different time partitions;
determining available slack; and
allocating slack to tasks in different time partitions.

6. In a data processing system executing tasks in different time partitions, a method of scheduling tasks comprising:
 - collecting unscheduled execution time from at least one time partition; and
 - allocating the unscheduled execution time to a task in another time partition.
7. The method of claim 6, wherein the task in the other partition is an aperiodic, non-essential task.
8. The method of claim 7, wherein the tasks comprise essential and non-essential tasks, and wherein the task in the other partition is from the group consisting of new non-essential tasks and enhancements to essential tasks.
9. The method of claim 6, wherein in collecting unscheduled execution time, both timeline slack and reclaimed slack are collected.
10. A machine-readable medium having instructions stored thereon capable of causing a processor to carry out a method, the method comprising:
 - scheduling tasks to execute in different time partitions;
 - collecting unscheduled execution time from at least one time partition; and
 - allocating the unscheduled execution time to a task in another time partition.
11. In a time-partitioned system executing essential and non-essential tasks, a method of scheduling tasks comprising:
 - determining available slack from the group consisting of timeline slack and reclaimed slack;
 - pooling available slack in a common slack pool; and
 - allocating slack from the common slack pool to tasks.

12. The method of claim 11, wherein in allocating, slack is allocated to non-essential tasks.
13. The method of claim 11, wherein in allocating, slack is allocated to a task from the group consisting of new non-essential tasks and enhancements to essential tasks.
14. A machine-readable medium having instructions stored thereon capable of causing a processor to carry out a method, the method comprising:
scheduling tasks to execute in different time partitions;
determining available slack from the group consisting of timeline slack and reclaimed slack;
pooling available slack in a common slack pool; and
allocating slack from the common slack pool to tasks.
15. In a time-partitioned system executing essential and non-essential tasks, a method of scheduling tasks comprising:
determining available timeline slack;
determining available reclaimed slack;
pooling available timeline and reclaimed slack; and
allocating slack to a task in any time partition.
16. The method of claim 15, wherein in allocating, slack is allocated to a non-essential task.

17. The method of claim 15, wherein in allocating, slack is allocated to a task from the group consisting of new non-essential tasks and enhancements to essential tasks.

18. A machine-readable medium having instructions stored thereon capable of causing a processor to carry out a method, the method comprising:

- scheduling tasks to execute in different time partitions;
- determining available timeline slack;
- determining available reclaimed slack;
- pooling available timeline and reclaimed slack; and
- allocating slack to a task in any time partition.

19. A time-partitioned system comprising:

- a processor;

- a plurality of tasks operating on the processor, wherein each task of the plurality of tasks is of a task type selected from the group consisting of essential and non-essential, wherein each task of the plurality of tasks has associated with it at least one worst case execution time; and

- an executive in communication with the processor and controlling dispatching of tasks on the processor, wherein the executive comprises:

- a first module that determines available slack; and

- a second module that allocates available slack to tasks in different time partitions.

20. The time-partitioned system of claim 19, wherein the first module determines available slack by determining slack from the group consisting of timeline slack, reclaimed slack, and idle time.

21. The time-partitioned system of claim 20, wherein the first module maintains a pool of available slack.
22. The time-partitioned system of claim 20, wherein the first module maintains a common pool of available slack that can be used by tasks in any time partition.
23. The time-partitioned system of claim 19, wherein the second module allocates available slack to tasks that are non-essential.
24. The time-partitioned system of claim 23, wherein the tasks are from the group consisting of new non-essential tasks and enhancements to essential tasks.
25. The time-partitioned system of claim 23, wherein the executive further comprises a third module that assigns different priority levels to tasks.
26. The time-partitioned system of claim 25, wherein the first module determines available slack for tasks at each priority level.
27. The time-partitioned system of claim 25, wherein the second module allocates available slack to tasks in order of priority.
28. The time-partitioned system of claim 19, wherein the system is a flight control system.
29. The time-partitioned system of claim 19, wherein the system is a real-time control system.

30. The time-partitioned system of claim 19, wherein the executive comprises a single set of slack variables and a single slack table.